PROFI-2510 / PROFI-2541 User Manual

Warranty

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

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Revision Note

Date	Author	Version	Revision
2012/11/31	**Ryan Lin**	**1.0**	Release

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1. Introduction

1.1. Overview

PROFIBUS is an open, digital communication system with a wide range of applications, particularly in the fields of factory automation and process automation. PROFIBUS is suitable for both fast, time-critical applications and complex communication tasks. PROFIBUS-DP is a famous protocol that enables simple, fast, cyclic and deterministic process data exchange between Master and assigned Slave.

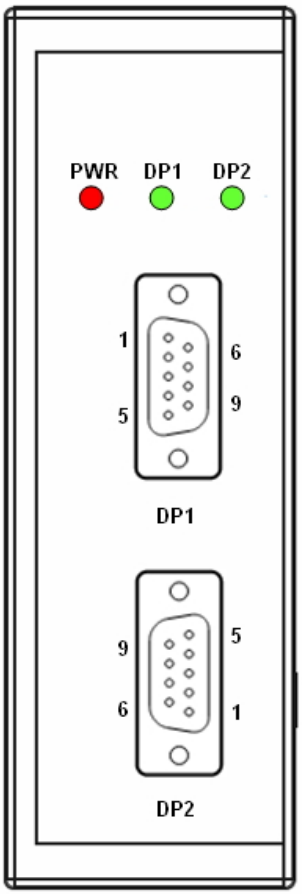
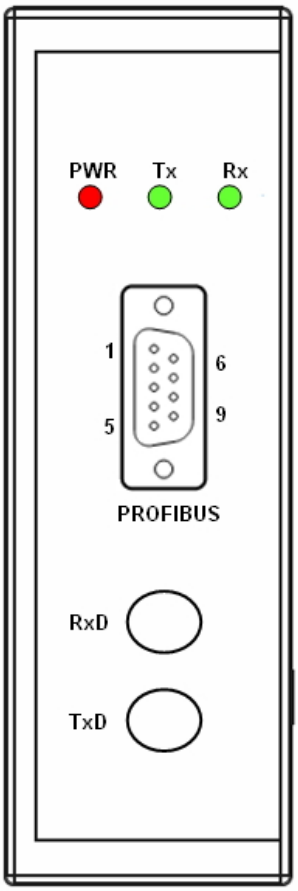
The PROFI-2510 is a PROFIBUS repeater used to establish a physical coupling of two or more segments of a CAN bus system. According to the PROFIBUS specification, up to 32 PROFIBUS devices are allowed per segment. Connecting via PROFI-2510, the division of a PROFIBUS system into several subsystems increases the maximum number of bus nodes.

The PROFI-2541 is a PROFIBUS to Fiber Converter and it is the economic solution for applications which require protecting the data transmission from electrical exposure, surges, lightning or chemical corrosion.

1.2. Product Information

Type	Model	Description
Repeater	PROFI-2510	Isolated PROFIBUS Repeater
Converter	PROFI-2541	PROFIBUS to Fiber Converter(ST Type)
	PROFI-2541-SC	PROFIBUS to Fiber Converter(SC Type)

1.3. Appearance

PROFI-2510	PROFI-2541(SC)
	

1.4. Features

- **PROFI-2510**

Protocol	PROFIBUS DP
Supports Transmission Rate (Kbps)	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000
Transmission Rate Setting	detected automatically
Indicators	PWR LED, DP1 LED and DP2 LED
ESD Protection	4kV class A
Network Isolation Protection	High Speed iCoupler
DC Isolation Protection	3000VDC on PROFIBUS side

- **PROFI-2541/ PROFI-2541-SC**

Protocol	PROFIBUS DP
Supports Transmission Rate (Kbps)	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000

Transmission Rate Setting	detected automatically
Indicators	PWR LED, TxD LED and RxD LED
Fiber Wave Length	850 nm
Fiber Type	ST / SC(Multi-Mode)
Network Isolation Protection	High Speed iCoupler
DC Isolation Protection	3000VDC on PROFIBUS side

1.5. Specifications

- **PROFI-2510**

PROFIBUS Interface	9-pin D-Sub(Female)
PROFIBUS Transceiver	ADI ADM2486 iCoupler Isolated transceiver
Transmission Rate	Up to 12Mbps
Power Requirement	10V ~ 30V
Power Consumption	1W
Operating Temp.	-25℃ ~ +75℃
Storage Temp.	-30℃ ~ +85℃
Humidity	5% ~ 95%(Non Condensing)
Dimensions	33 mm x 126.8 mm x 93.4 mm (W x L x H)

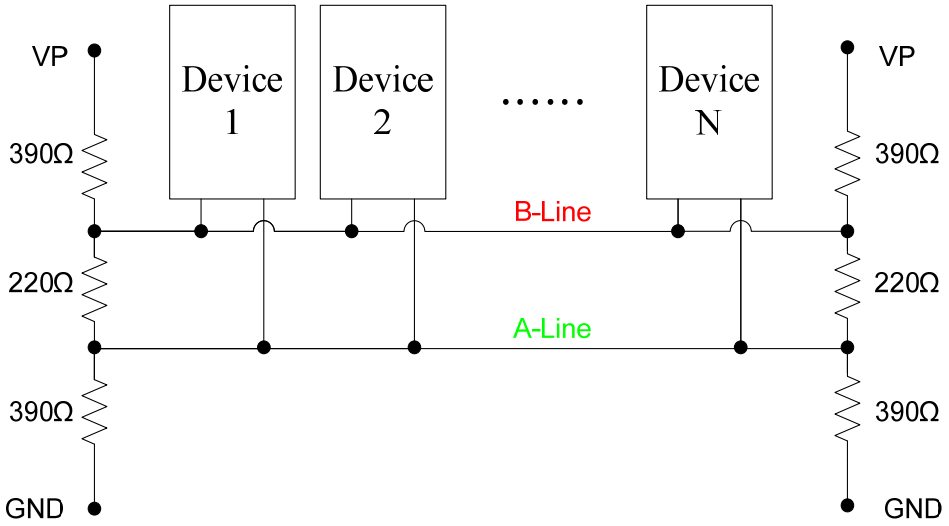
- **PROFI-2541/ PROFI-2541-SC**

PROFIBUS Interface	9-pin D-Sub(Female)
PROFIBUS Transceiver	ADI ADM2486 iCoupler Isolated transceiver
Transmission Rate	Up to 3Mbps
Power Requirement	10V ~ 30V
Connector	ST / SC(Multi-Mode)
Wave Length	850 nm
Fiber cable	62.5 / 125 μm
Propagation Delay	125ns max (125ns delay shortens bus line length by ~ 25 m)
Transmission Distance	1.4 km max (in 62.5/125 μm fiber cable)
Operating Temp.	-25℃ ~ +75℃
Storage Temp.	-30℃ ~ +85℃
Humidity	5% ~ 95%(Non Condensing)
Dimensions	33 mm x 126.8 mm x 104.5 mm (W x L x H)

2. Hardware

2.1. Bus Wiring

In order to minimize the reflection effect of the signal transmission, PROFIBUS device has to fit with an active terminal resistor at both first node and last node, as shown below



However, the number of station in PROFIBUS network is also restricted. According to PROFIBUS specification, it is up to 32 stations connected in a PROFIBUS segment. If more than 32 stations are connected, the PROFIBUS repeater must be used to link the individual bus segments.

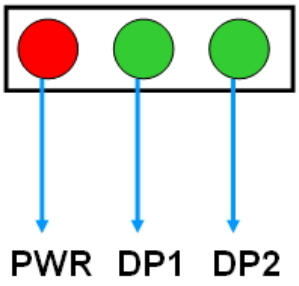
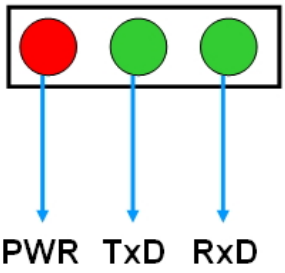
2.2. PROFIBUS Cable and Transmission Distance

The PROFIBUS cable with following properties has different transmission distance with respect to different transmission rate, shown in the following table

1. Impedance :135~165Ω
2. Capacity : lower than 30 pF/m
3. Loop resistance : lower than 110Ω/Km
4. Wire diameter : larger than 0.65mm
5. Core cross-section : larger than 0.34mm^2

Transmission Rate(Kbps)	Transmission Distance per Segment (meter)
9.6, 19.2, 45.45, 93.75	1200
187.5	1000
500	400
1500	200
3000, 6000, 12000	100

2.3. Status Indicator

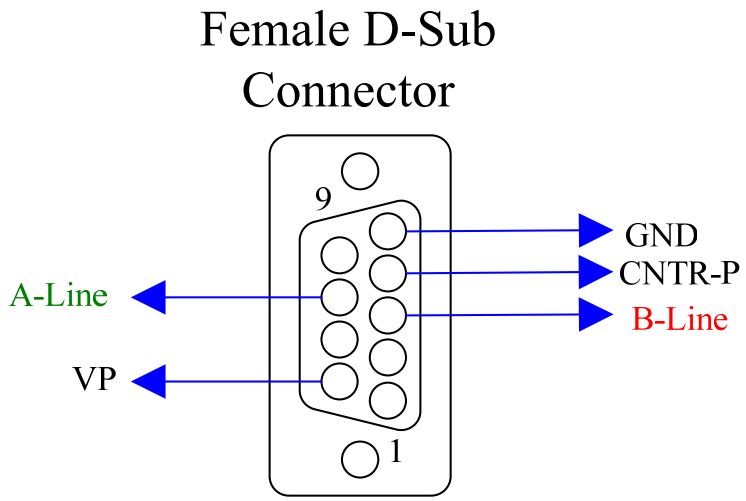
PROFI-2510	PROFI-2541(SC)
	

It provides three status indicator, In PROFI-2510, they are PWR LED (red),DP1 LED(green) and DP2 LED (green). In PROFI-2541(SC), they are PWR LED (red), TxD LED(green) and RxD LED (green). When the power is supplied to module, PWR LED will turn on; Transmitting/receiving one data to/from fiber cable will flash the DP1/DP2/TxD/RxD LED once. The DP1/DP2/TxD/RxD LED may always be turned on if there are a lot of datas transmitted on fiber cable.

PROFI-2510		PROFI-2541(SC)	
PWR Led (Red)		PWR Led (Red)	
ON	Module active	ON	Module active
OFF	Module inactive	OFF	Module inactive
DP1 Led (Green)		TxD Led (Green)	
Flashing	Data transmitting	Flashing	Data transmitting
OFF	No data transmitting	OFF	No data transmitting
DP2 Led (Green)		RxD Led (Green)	
Flashing	Data transmitting	Flashing	Data transmitting
OFF	No data transmitting	OFF	No data transmitting

2.4. Connector

The connector of PROFI-2510 / PROFI-2541(SC) is shown below



Pin No.	Signal	Meaning
3	B-Line	Receive/Transmit data - plus
4	CNTR-P	Repeater control signal, RTS signal
5	GND	Power ground of active terminator
6	VP	Power 5 volt of active terminator
8	A-Line	Receive/Transmit data - minus

Note: The connector of PROFI-2510 / PROFI-2541(SC) has no terminators; users must use the connector with the terminator inside. The power of the terminator will provide by terminal device.

2.5. Baud rate support

PROFI-2510 / PROFI-2541(SC) has a functionality of auto- detection for baud rates, users don't need to set the baud rate manually.

PROFI-2510 supports the entire baud rates of PROFIBUS. They are 9.6Kbps, 19.2Kbps, 45.45Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, 3Mbps, 6Mbps, and 12Mbps.

PROFI-2541(SC) supports the entire baud rates of PROFIBUS. They are 9.6Kbps, 19.2Kbps, 45.45Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, and 3Mbps.

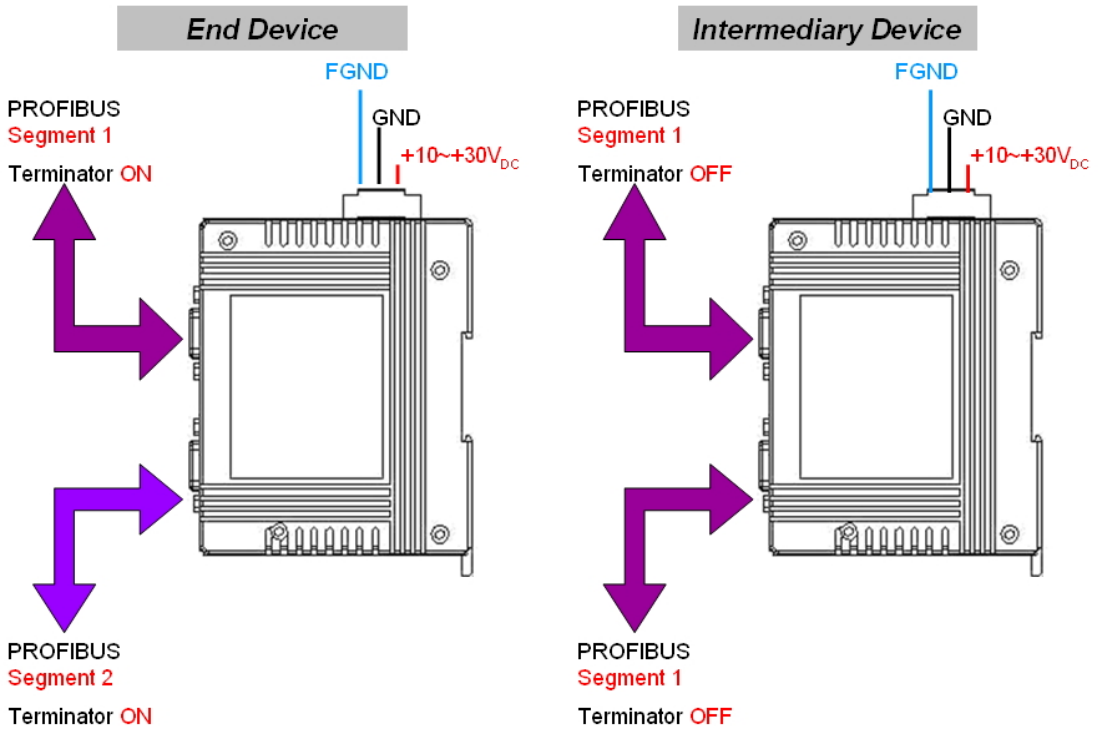
Note: Many baud rates only are supported by the particular cable or speed. For the detail, please refer to the above section "**PROFIBUS Cable and Transmission Distance"**

2.6. Wire Connection

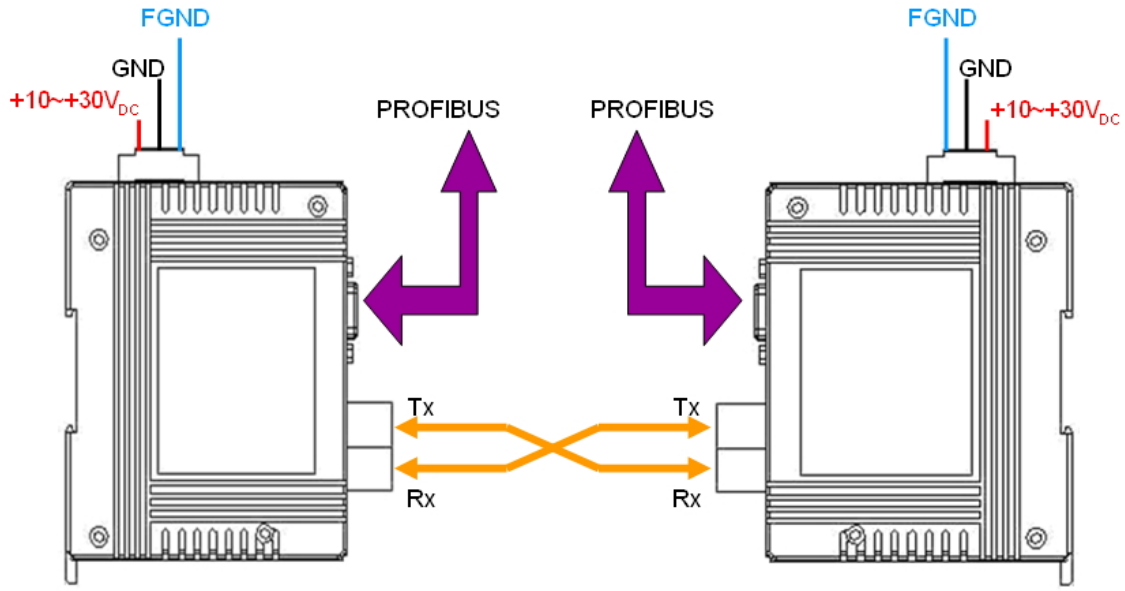
- PROFI-2510

  If PROFI-2510 is a end device of PROFIBUS segment 1 and PROFIBUS segment 2. The terminal resistor of segment 1 is ON. The terminal resistor of segment 2 is ON.

  If PROFI-2510 is an intermediary device of PROFIBUS segment 1. The terminal resistor of segment 1 is OFF.

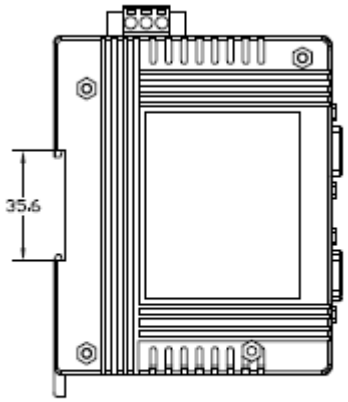


- PROFI-2541(SC)

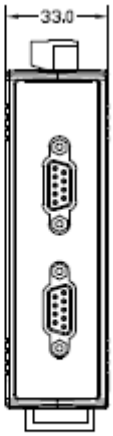


Appendix A. Dimensions

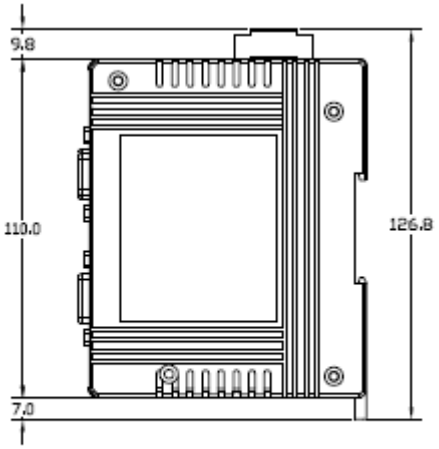
- **PROFI-2510**



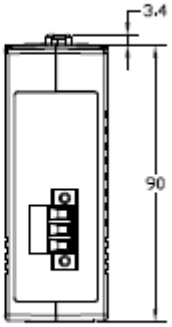
Right Side View



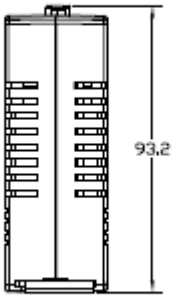
Front View



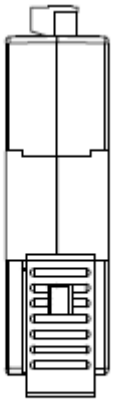
Left Side View



Top View

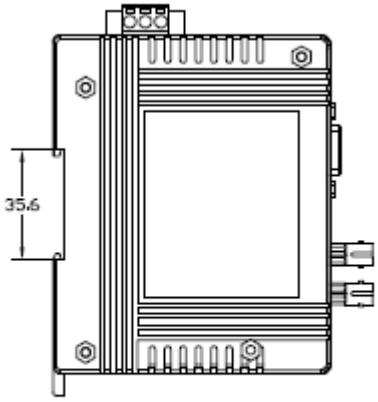


Bottom View

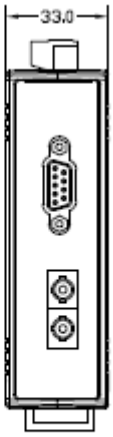


Back View

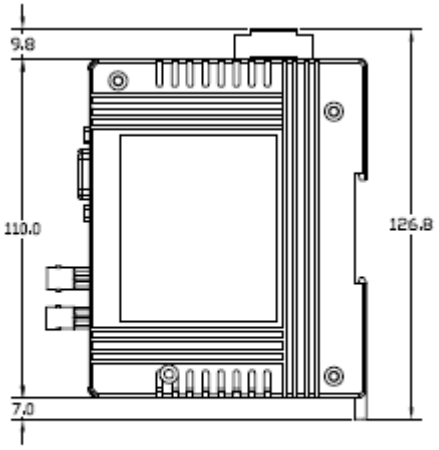
- **PROFI-2541**



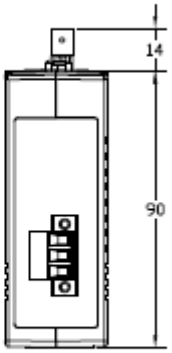
Right Side View



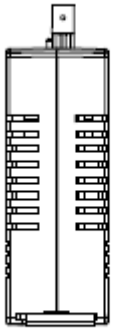
Front View



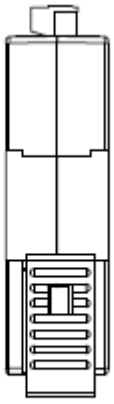
Left Side View



Top View

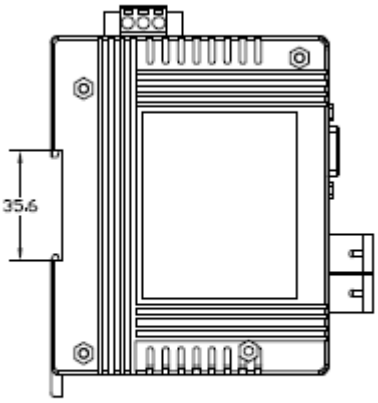


Bottom View

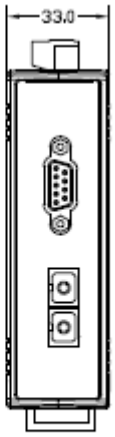


Back View

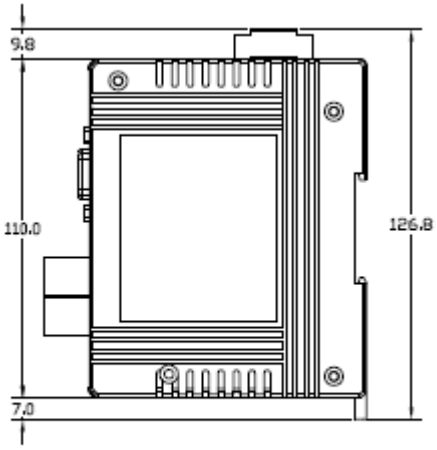
- **PROFI-2541-SC**



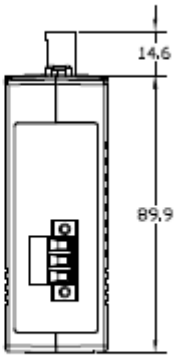
Right Side View



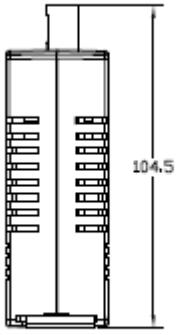
Front View



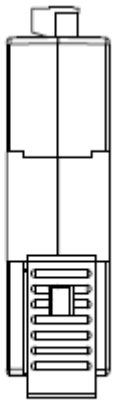
Left Side View



Top View



Bottom View



Back View